ACC.12
61st Annual Scientific Session & Expo
ACC-i2 with TCT innovation in intervention

E2068
JACC March 27, 2012
Volume 59, Issue 13

Vascular Disease

FAVORABLE EFFECTS OF FLAVONOIDS ON ENDOTHELIAL FUNCTION AND ARTERIAL STIFFNESS IN HEALTHY SMOKERS

ACC Moderated Poster Contributions
McCormick Place South, Hall A
Saturday, March 24, 2012, 9:30 a.m.-10:30 a.m.

Session Title: Peripheral Vascular Disease State of the Science I
Abstract Category: 35. Peripheral Arterial/Carotid Disease/Aortic Disease
Presentation Number: 1119-304

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Background: Smoking is associated with impaired vascular function. Consumption of concord grape juice (CGJ), a rich source of flavonoids, has previously been shown to have antithrombotic and antioxidant effects and moreover can modify cardiovascular risk factors. In the present study we assessed the hypothesis that CGJ can improve endothelial function and arterial stiffness in healthy smokers.

Methods: We studied the effect of a 2 weeks oral treatment with 7cc/Kg/day of CGJ (Welch's 100% Concord Grape) in 20 healthy smokers (aged 26±5y) on two occasions (day 0-baseline and day 14). The study was carried out on two separate arms, one with CGJ and one with placebo, according to a randomized, placebo-controlled, double-blind, cross-over design. Measurements were carried out before (pSm) and immediately after (Sm0) cigarette smoking. Endothelial function was evaluated by flow-mediated dilation (FMD) of the brachial artery. Carotid-femoral pulse wave velocity (PWV) was measured as an index of aortic stiffness and augmentation index (AIx) as a measure of arterial wave reflections.

Results: At baseline measurements, compared to pSm, cigarette smoking decreased FMD values (8.58±3.17% vs.5.65±1.98%, p<0.001) and moreover caused an increase in AIx (4.19±9.13% vs. 6.26±9.81%, p=0.013) and PWV (6.02±0.67m/sec vs. 6.21±0.68m/sec, p<0.046). Treatment with CGJ, improved pSm values of: FMD (7.87±2.79% vs. 9.43±2.62%, p=0.024), PWV (6.11±0.58m/sec vs. 5.70±0.6m/sec, p=0.013) and AIx (3.03±7.70% vs. -0.59±8.56%, p=0.016), while there was no statistically significant difference with placebo administration. Finally, compared with placebo, at day 14, treatment with CGJ, blunted the acute smoking-induced increase in PWV (placebo: from 5.67±0.64m/sec Psm to 6.00±0.78m/sec Sm0), (CGJ: from 6.00±0.73m/sec Psm to 6.23±0.66m/sec Sm0) (p=0.012).

Conclusion: Concord grape juice contains specific flavonoids that may improve endothelium-dependent vasodilation and vascular elastic properties of the arterial tree in healthy smokers. Improved endothelial function and decreased arterial stiffness is a potential mechanism by which flavonoids may prevent cardiovascular events.